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# **The effects of self-efficacy on pro-environmental intentions**

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## **Abstract**

The effect of self-efficacy on pro-environmental intentions was studied in thirty five individuals. Each participant was required to watch a fear-inducing global warming video and complete three separate questionnaires to monitor their emotion response, felt-responsibility and level of pro-environmental intention. There was very little difference presented between the self-efficacy condition and the control group, suggesting that self-efficacy had little effect on the level of pro-environmental intentions recorded. However there was a significant level of  $F(1,30) = 7.71$ ,  $p=.009$ , discovered between the level of reported pro-environmental intention presented between Time one and Time two for the control group, suggesting that the lack of self-efficacy decreased their lasting pro-environmental intentions.

## **Introduction**

The debate of climate change and whether it is in fact the result of specific human activity has been circulating for many decades. Scientists of the international body of atmosphere called the Intergovernmental Panel on Climate Change (IPCC) concluded back in 1996 that “the balance of evidence suggests that there is a discernible human influence on global warming.” (IPCC, 1996, p5) .And within more recent reports claimed that the warming of the climate system is “unequivocal.” (IPCC 2007). By the year 2100 IPCC calculates that the global mean surface air temperature would have increased by 2 °C. Although this increase may appear rather small, National Geographic (2007) suggests that the impact of this minor change in temperature could completely alter regional climates, resulting in increased heat waves and droughts, as well as extreme storms and flooding. The 2 °C increase could contribute to the melting of the polar ice caps, leading to low-lying coastal land becoming submerged. An extreme scenario of this would be the melting of the west Antarctic ice sheet producing a five-meter rise in sea levels, causing much of Miami, New Orleans and New York to be flooded.

Humans’ contributions to the current planetary warming also known as anthropogenic climate change, is rooted in acts of industrialization, deforestation and pollution. The IPCC (1996) estimated that humans contribute to around 90% of the greenhouse warming effect via the production and release of carbon dioxide and methane gases into the atmosphere, through the burning of fossil fuels and other organic substances. Although scientific input presented by IPCC may suggest that there is no debate that global warming is occurring and that it is the result of human activity, the level of pro-environmental action demonstrated raises questions of the barriers involved in changing individuals’ attitudes and intentions towards the issues of global warming.

Gifford (2011) identified barriers that could contribute to inactivity in sustainable living and suggests why individuals continue with environmentally destructive patterns of behaviour. One of the initial barriers suggested by Gifford is ignorance, this does not only include a lack of knowledge of global warming but also an unawareness of how to deal with the issue. Information of global warming is presented in a variety of ways and sometimes it can be the conflicting messages of global warming that fuel an individual’s uncertainty. Gifford (2011) concluded that uncertainty can cause a general underestimation of how likely it is to be true, which can be an individual’s justification for inaction. Repeated exposure to global warming information can also cause a level of numbness to the issue and decreased attention due to habituation. Therefore it would appear that not only is the level of global warming information and its content important but also the way in which the information is presented.

Fear appeals within the media have become an increasingly popular approach to the presentation of global warming information. This occurs in many forms such as the imagery chosen, in 2008 the green party used an image depicting the British isle completely flooded in their election campaign. The use of alarmist language has also become second nature in global warming media, a conference held in Exeter in 2005 was even named the Conference on Dangerous Climate Change. (O’Neill and Nicholson-Cole 2009). It would appear that the general global warming message that is portrayed is of doom, judgement and devastation on an apocalyptic scale. However it could be argued that the media choose this drastic fear induced form of

communication to catch the viewers' attention, but is a fear appeal the most effective method?

Witte (1992) states that there are three separate components to a fear appeal. The first aspect consists of the recognition of its existence, including the individual's perceived severity of the issue and their own susceptibility to the threat. The second feature is inducing a fearful emotional response to the threat and the final section places emphasis on the perceived self-efficacy in response to the fear experienced by the individual. Lorenzoni, Jones and Turnpenny (2006) argue that because the concerns of global warming are currently intangible and do not present an immediate or personal threat, it allows the individual to view the problem as distant both in time and in relation to themselves. Attaining this viewpoint can affect the individual's general attention to the matter and the way in which they perceive the issue and their involvement. This therefore impersonal and distant issue suggested by Lorenzoni et al (2006) makes fear appeals very difficult to achieve and sustain over time.

Lowe, Brown, Dessai, Franca Doria, Haynes and Vincent (2006) explored the effectiveness of the fear theory by asking individuals to watch the movie 'The Day After Tomorrow'. The film depicts the extreme possibilities of climate change, with powerful imagery of New York City completely destroyed by hurricane storms and flooding. Lowe et al asked participants to complete questionnaires, prior to watching the video, directly afterwards and a month later, to monitor their awareness and concerns about global warming. Results showed that although 67% of participants agreed to the statement 'everybody has to do something about global warming' directly after watching the movie, this had completely diminished by the time of the follow up questionnaire a month later. The results therefore suggest that although there may have been an initial effect created by the fear factor stimulus, the effects were not lasting. However if we examine this research whilst considering Witte's components to a successful fear appeal, it could be argued that Lowe et al's (2006) work did not meet all of the necessary criteria.

Witte (1992) stipulated that there was a requirement for the individual to become aware of the severity of the issue and this was achieved within Lowe et al's (2006) video choice, although it could be argued that by using this form of information the participant may consider it to be simply fiction or exaggerated for the film's effect. Therefore scepticism of the real possibility and effects of global warming may have been hindered. Witte's (1992) second feature of emotional response was certainly intended by the production team of the film. However, this is an aspect that can differ at an individual level and it may be that the emotional message of global warming could have been overlooked or misattributed to other aspects of the film, such as the reuniting of family members overpowering the devastating global warming scenes. The final component of self-efficacy appears to be the most ignored within this research. It initially seems difficult to achieve when the story depicts the effects of global warming happening abruptly in the present day and this may lead an individual to feel that this could occur at any moment, therefore it is too late to do anything about it or that is going to happen regardless of what they do, so why bother changing? It would be interesting to repeat this study with a different film that is based within the future and although it may depict similar events to those within 'The Day After Tomorrow' it would allow the viewer to see it as a future scenario and one that can be altered with pro-environmental action in the present day.

However this would have to be delicately done because it has been highlighted by Lorenzoni et al (2006) that creating an impression that global warming is a future issue may cause the individual to think of it as something that will not affect them directly and is an issue for their children or even grandchildren to consider. Research completed by Tonn, Hemrick and Conrad (2006) required individuals to imagine the future, in relation to possible global warming outcomes, at several intervals and the results highlighted the participants difficulty beyond 15 to 20 years. When asked about the world's condition in the year 2050 the participants viewed it as so far in the future that any thoughts were completely hypothetical. Therefore it would appear that identifying the key ingredients to produce an effective and lasting global warming message is an extremely difficult task.

Although fear appears to have its basis in the initial stages of gaining the individual attention, research by Lowe et al (2006) suggests that it is an effective tool in creating a lasting impression and ultimately influences pro-environmental action, which is the overall goal. A slightly different approach to the presentation of global warming information has been accomplished by Greg Craven. Craven (2009) has released a number of videos on the internet and has written a book entitled 'What's the Worst that Could Happen' to share his viewpoint on the global warming debate. By initially discussing it as a debate the viewer is not bombarded by stereotypical global warming information and is allowed to interpret the information presented in whichever way they feel appropriate. The vast majority of the video is constructed around the probability of global warming occurring, with four possible future outcomes. These were divided by global warming either taking place or not and by whether pro-environmental action was taken or not. (See appendix one) There is a fear aspect within this mix, as the future scenarios, which are presented with global warming occurring, are described in detail, considering the worst case possible when there is inaction. By the end of the video the viewer is left feeling that the debate of global warming is irrelevant as there is little control of its existence, but by focusing on what we do have control of, in this case participating in pro-environmental action, we can combat whatever future we are presented with. Craven's presentation technique strongly encourages pro-environmental action and with over 10 million viewings it is clear to see why Craven's method has become so popular. However it has received its fair share of criticism for its simplicity and probability-focused technique but it still appears to have strong foundations for projecting a pro environmental message. However the aspect of self-efficacy appears to be only touched upon by Craven and although the message of taking action is clear this may still be hindered by acceptance of personal responsibility and concern, which could be crucial in achieving lasting effects that have been unsuccessful in previous research by Lowe et al (2006).

Gifford (2011) discusses that self-efficacy can be one of the more difficult barriers to overcome and this is because global warming is a worldwide problem, which diminishes an individual's belief that they can make a difference. Gifford suggests that it is easy for an individual to perceive that they have little behavioural control over the outcome, or that their own actions will have little impact. In extreme cases there can be an element of fatalism, which is a perception that nothing can be done by the individual, or even collectively, to combat the issue of global warming.

Kellstedt, Zahran and Vedlitz (2008) suggest that there are three components to self-efficacy, the first revolves around the individual's perception of how they influence

climate change. The second feature is the ability for that individual to induce others to behave pro-environmentally and the final aspect is the acceptance of human responsibility for climate change. Kellstedt et al (2008) states that although an individual may possess a component or two, without acquiring all three there will be little lasting effects. As Gifford (2011) discussed, ignorance and a general lack of knowledge on global warming can be a major contributor to people's justification of inaction, but Kellstedt et al (2008) expands on this theory by highlighting the importance of accurate information, delivered from a trustworthy source.

The media's coverage on global warming portrays the issue as an unsettled controversy and uses a multitude of resources to allow several angles to be presented, many of which are not of scientific value. This may lead to an incorrect assessment of the risk or an underestimation of how likely global warming is to occur, causing an individual to favour inaction. Poortinga and Pidgeon (2003) found U.K. individuals more likely to trust environmental organizations and scientists, working for environmental groups or universities, to tell the truth about climate change, but their participants were somewhat ambivalent about trusting local authorities, the national government or the European Union.

The overall risk assessment of the global warming debate is crucial within self-efficacy because if the individual feels that other matters are of a higher importance, then they may postpone action or completely ignore the issue. A survey completed by DEFRA (2007) highlighted that 99% of individuals recognised the term climate change, however without prompting, over a third of the U.K. public stated that crime, health, economic concerns, and education are issues that the government should deal with, with just 1% stating the same about climate change or global warming. These issues are more immediate and pressing on a daily basis, with climate change being a much less tangible issue of concern. These statistics illustrate the lowered risk perception of the issue of global warming, hindering people from engaging with climate change in ways that go beyond the tokenistic. Kellstedt et al (2008) argues that the use of scientific information within the global warming debate, presented by the media, will improve the level of trust and ultimately will lead to the individual experiencing a heightened level of personal responsibility and risk perception. Kellstedt et al (2008) findings demonstrated a strong relationship between the felt-responsibility for global warming and risk assessment, indicating that to achieve a state of felt-responsibility there needs to be a clear acceptance and understanding of the risk associated with global warming, which is to be expected when considering the DEFRA statistics. However further exploration discovered that increased levels of global warming information actually lead to a reduction in the level of concern and felt-responsibility. Suggesting the amount of information alone is not a clear predictor of behavioural intention and self-efficacy experienced and in extreme cases an excessive amount of information can lead to habituation, as previously discussed within Gifford's (2011) pro-environmental barriers. It should be noted that within the Kellstedt et al (2008) research the average age of participants was forty-seven and there may be a general lowered level of responsibility experienced purely because it could have been portrayed, with questions focused on twenty-five years and plus into the future, that this is an issue that will not affect them personally. It would be interesting to see if a lower average age group would have produced a different result and perhaps one with a higher level of felt-responsibility.

The Kellstadt et al (2008) results highlight that there is not a simple one dimensional process that can be completed to achieve high self-efficacy and cause pro-environmental action. Lorenzoni, Nicholson-Cole and Whitmarsh (2007) coined the term “engagement” to describe the importance of connecting cognition, affect and behaviour in combatting global warming. This state of connection comprises of the individual becoming engaged in the citizen’s responsibility for influencing policy through election and driving consumption patterns and trends through purchasing power. The other element to Lorenzo’s et al vision is the engagement of decarbonisation activities and lifestyle changes, through car use, heating, lighting and appliance use, as domestic emissions represent around a third of total UK emissions. To achieve this level of engagement it would appear that information alone is not a strong enough component and therefore further expansion of self-efficacy appears crucial to optimising both felt-responsibility and action.

One theory that demonstrates the power of self-efficacy is the theory of planned behaviour. Ajzen (1991) suggested that there are several different elements involved in the development of a behaviour intention and although information and knowledge is a starting factor, the individual then needs to consider their attitudes and beliefs before committing to the behaviour. One of the most prominent beliefs within this framework is the control belief and this is formulated around perceived behavioural control, which is vital within self-efficacy as it describes the actual perceived ability and confidence in successfully completing the behaviour. It also plays a central role in self-regulation of behaviour and persistence in the face of obstacles. Research completed by Sirois (2003) emphasised the importance of self-efficacy in intentions. Sirois (2003) rated health intentions for the near future and compared these to the participant’s self-efficacy level, formulated from a number of questionnaires. The results highlighted that the individuals who reported a lower intention to perform the action in the near future, also were found to have a low self-efficacy. These findings suggest a strong relationship between self-efficacy and behaviour intention and, therefore, a logical conclusion to be drawn from this is that to achieve a greater intention level there needs to be a manipulation of the individual self-efficacy level.

Zomeran, Spears and Leach (2010) attempted to increase an individual’s level of self-efficacy by adopting Witte (1992) fear model and accompanying fear stimulus with a self-efficacy statement. All participants read about the possible outcomes of climate change, with a focus of the devastation it could cause and then those within the self-efficacy condition received the following statement “according to the IPCC, the climate crisis is not an unsolvable problem. Many experts share this opinion. For example, according to Prof. Harald Neumann, an independent climate expert from Stanford University, individuals can prevent the negative future consequences of the climate crisis by changing their own behaviour.” (Zomeran 2010 p342) This method resulted in a dual pathway, with an initial emotion-focused approach causing environmental actions to become increased by the fear of negative future consequences of climate change and then intentions became further increased by communicating a strong self-efficacy, which highlights a problem-focused aspect. However the findings within Zomeran’s (2010) research only considers the immediate intentions expressed by the participants and therefore does not allow a dismissal of previous issues, displayed by the Lowe et al (2006) work, that found these immediate intentions to diminish over time. It would be interesting to see if the injection of a self-efficacy manipulation would aid these intentions to last over time.

Therefore the present study was developed to explore the relationship between self-efficacy and lasting pro-environmental intentions. The hypothesis was that the individuals placed within the self-efficacy condition would achieve a higher level of lasting pro-environmental intentions than the control group. The independent variable was the group allocation, either into one that receives the self-efficacy statement or one that receives no statement. The dependent variable was the level of pro-environmental intentions recorded directly after the statement and again after a five day interval.

## **Methodology**

### **Participants**

In the total there were thirty five participants, (twelve males and twenty-three females) eight were undergraduate psychology students studying at the University of Plymouth who participated as part of a course requirement for a compulsory module in research methods. The remaining twenty-seven were volunteers who came forward in response to an advertisement placed on a social networking site. All participants were over the age of eighteen, with an average age of twenty-four.

### **Materials**

Each participant was presented with a printed hand out on arrival that consisted of the experiments brief (see appendix two). The informative fear stimulus used was a video clip created by Craven (2009), accessible through his website [www.gregcraven.org](http://www.gregcraven.org) but which had been integrated into a specific program sequence to ensure that the video was watched before the completion of the questionnaires. Headphones were provided to ensure each participant could hear the video accurately and were not distracted by outside noise. Those that had been placed within the self-efficacy group, received a self-efficacy statement, constructed to heighten both personal and group felt efficacy. (See appendix three) Three separate questionnaires were constructed to monitor emotional responses to the stimulus, felt-responsibility and pro-environmental intention. (See appendix four, five and six) Each were developed using a seven point Likert rating scale and to avoid acquiescence response bias there were both positive and negatively worded questions. All questionnaires were presented electronically via an online web source, (<http://www.psy.plymouth.ac.uk/onlineresearch/EnvironmentalChange/>) with all answers saved online and accessible through excel programming. At the end of the experiment the participant was presented with a debrief statement. (See appendix seven)

### **Design and Procedures**

A between-subjects design was used in which each participant only experienced one condition. All participants experienced the same environment during the majority of the experiment, which consisted of a computer laboratory in the University of Plymouth, however the follow up stage was merely online and could have been completed in the participants chosen environment. The order in which the participants began the study determined which experimental condition group they were allocated to. A purely random allocation system could not be used because there was a need for an equal number of participants within each group, which could not have been guaranteed with random distribution. Participants were tested over the course of four weeks and this varied in time between 9.00am and 5.00pm. The



first stage of the experiment took on average fifteen minutes to complete, with the second part taking approximately a further ten minutes.

On arrival each participant was given a moment to read the study brief and then asked to complete the consent form. At this point the experimenter reiterated that they had the right to withdraw at any point and then ensured that each participant knew their email address to guarantee that the follow up section could be accessed. Once their email had been clarified they were then instructed to put on their headphones and begin the already loaded program, which presented the informative fear stimulating video. The video, created by Craven (2009) portrayed future world scenarios dependent on whether global warming occurs and how pro-environmental action can affect the outcome, (See appendix one). After the video those that had been placed within the self-efficacy group received the self-efficacy statement (see appendix three), those allocated to the control group, moved straight on to the first of the questionnaires that focused on their emotional response to the video, (See appendix four). Two further questionnaires were then presented, focusing on measuring the individual's felt-responsibility towards the global warming issue and their pro-environmental intentions in the future. At this point the participants were informed that they had come to the end of part one and would receive an email five days later containing part two. Participants were instructed to complete the second part of the study within five to seven days. The program automatically sent an email to the participants after a five day interval, asking them to complete two further questionnaires, consisting of the original felt-responsibility and pro-environmental intentions questionnaires. All data was transferred into one single excel spreadsheet and after that reversing the scores of the negatively worded questions to ensure that each question was measuring the same direction. The higher score achieved on the emotions questionnaire represented a negative emotional response, highlighting a preference for items such as fearful, powerless and nervous. A lower score reflects an agreement with more positive emotions such as happy, optimistic and inspired. Felt-responsibility was simply organised so that the higher the score the more responsibility was experienced and within pro-environmental intentions the higher the score then the more likely the individual is to complete that action in the future.

## **Results**

Reliability tests were completed on each of the questionnaires, to ensure that they were all measuring what was intended. Firstly the emotions questionnaire was tested and the Cronbach's alpha for this scale was .810. (See Appendix Five). On assessment of the scale, items 1, 14 and 16 were found to have a low correlation and on removal would improve the Cronbach alpha to .827. However it was decided that all questions would remain to allow a full expression of experienced emotions to be recorded. The felt-responsibility questionnaire produced a Cronbach alpha of .830, with the lowest correlating items consisting of questions 2 and 3. (See Appendix Six) Removal of these items could result in a Cronbach alpha increase to .849. However the removal of these items would decrease an already small questionnaire and because both items are written negatively it was feared that the scale would become predominantly positively worded and this could lead to an acquiescence response bias, therefore all items were kept. The final pro-environmental intentions questionnaire formed a Cronbach alpha of .885. (See Appendix Seven). On assessment of the scale, item 1 was found to have a low correlation and on removal would increase the Cronbach alpha to .895, however it

was felt that item 1 was an important representative of pro-environmental action and was therefore kept within the current study. The descriptive details of each of the questionnaires are shown in table 1.

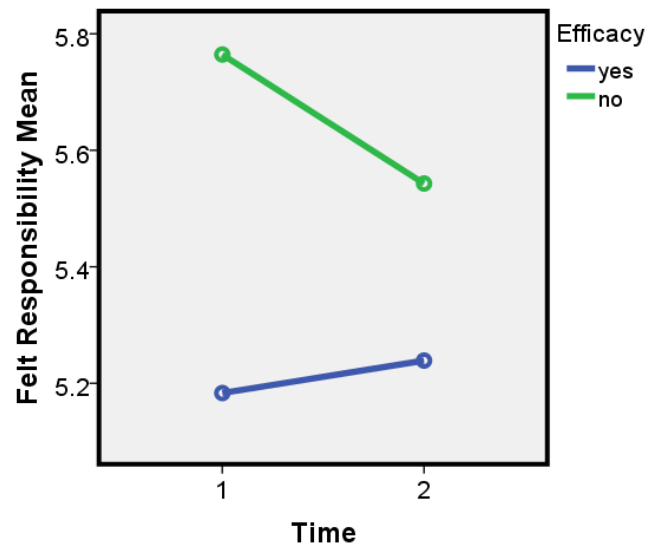
**Table 1:** Mean and standard deviation for each of the three questionnaires, Time 1 reflects the initial answers received directly after the video and Time 2 represents the scores achieved after a week interval.

Questionnaire	Efficacy Statement	No. of participants	Mean	Standard Deviation
Emotion	Yes	19	3.56	.72
	No	16	3.69	.68
Felt Responsibility Time 1	Yes	19	5.21	.76
	No	16	5.63	.83
Felt Responsibility Time 2	Yes	18	5.24	.62
	No	14	5.54	.54
Intentions Time 1	Yes	19	5	.79
	No	16	5.44	.92
Intentions Time 2	Yes	18	5.12	.78
	No	14	5.21	.74

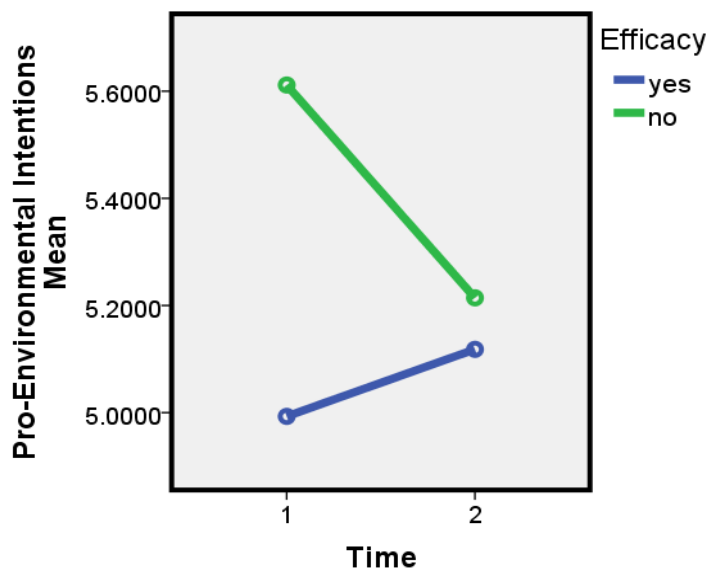
Table 1 indicates that the predicted increased level of felt responsibility and pro-environmental intentions within the self-efficacy group were not achieved, although it would appear that there was slight change experienced by both groups between Time 1 and Time 2. Initially an independent T test was performed on the emotional scores recorded and the two conditions but there was no significance found:  $t = -.379$ ,  $df = 33$ ,  $p = .71$ , two tailed.

A within-subjects liner model was used to explore the small alterations presented between Time 1 and Time 2 further. Firstly focusing on the felt-responsibility questionnaire, there was no significance found  $F(1,30) = 1.94$ ,  $p = .17$ . However graph 1 depicts that although there might not be a strong significant finding, there does appear to be a difference, if only slight, experienced between the groups.

Graph 1 highlights that on average the individuals within the none-efficacy group actually reported a slightly higher sense of felt-responsibility, however, even though the participants within the self-efficacy group didn't report a higher level of felt responsibility, the graph 1 shows that this level does not diminish at all over time unlike the control group. The experienced change over time was explored further by completing another within-subjects liner model on the reported pro-environmental intentions scores and there was a level of significance found  $F(1,30) = 7.71$ ,  $p = .009$ . This significance level represents the drop that occurs within the control group between Time 1 and Time 2, which is demonstrated within graph 2.



**Graph 1:** Scatter plot depicting the relationship between the self-efficacy condition and the reported felt responsibility at Time 1 and Time 2. Total number of participants at Time 1=35 and at Time 2=32.



**Graph 2:** Scatter plot highlighting the relationship of the self-efficacy condition and the pro-environmental intentions recorded at Time 1 and Time 2. Total number of participants at Time 1=35, at Time 2=32.

Graph 2 clearly shows the reported level of pro-environmental intentions of the control group decrease between Time 1 and Time 2. It also illustrates that although the self-efficacy group didn't achieve a higher reported level of pro-environmental intention at Time 1 in comparison to the control group, their score actually increases by Time 2, which corresponds with the original prediction. However the score

achieved by self-efficacy group at Time 2 still did exceed or even match what was achieved by the control group.

## **Discussion**

The relationship between self-efficacy and pro-environmental intentions was inconsistent with the experimental hypothesis. From the mere descriptive statistics it was clear that there was very little difference experienced between the control group and the self-efficacy group and it actually presented that individuals within the control group scored on average slightly higher on both levels of felt-responsibility and pro-environmental intentions scores. Therefore the alternative hypothesis is rejected. However when considering the lasting effects of the two conditions it is interesting to note that the participants within the self-efficacy group managed to maintain their recorded felt-responsibility score and in the case of reported pro-environmental intentions their scores slightly increased. This was not experienced within the control group, as the complete opposite occurred with a significant decrease in score present within the pro-environmental intentions as  $F(1,30) = 7.71$ ,  $p=.009$ . This highlights that, although a higher score was not achieved, the self-efficacy group did accomplish a lasting effect but unfortunately the level of pro-environmental intention reported at Time two did not exceed the level reported by the control group. This therefore further justifies the rejections of the alternative hypothesis.

When reviewing the results the initial component that stood out was the insignificant level achieved when exploring the emotions reported by the two conditions. It would have been expected that individuals placed within the control group would have on average achieved a higher score, as it could have been suggested that, because the participants did not receive the self-efficacy statement, they may have been left more fearful of the information and the possible outcomes of global warming. However this was not found within the results, it would appear that both conditions reported similar emotional experiences of a primarily neutral nature. This suggests that perhaps the selected fear-inducing video stimuli was not completely effective in its task and it could be argued that, because it did not just focus on the negative positive outcomes of global warming but actually highlighted the possibility that global warming does not occur and therefore suggests that the individual was not left fearful, which was initially intended, but in fact was left considering that there are many plausible outcomes that are going to happen regardless of what action is taken. The concept of pro-environmental action is presented within this video as a tool to deal with whatever future we meet and therefore it could be suggested that an individual would consider that pro-environmental action cannot prevent the negative outcomes from happening. This underestimation of pro-environmental action effectiveness could result in the individual ultimately feeling that they have very little control over what is going to happen, perhaps to an extent that is not reversible by the presentation of a self-efficacy statement. Feelings of lack of control over an impending future may lead to Gifford's (2011) suggested justification for inaction. Another principal that may have had an effect was the lack of powerful imagery used within the video. The Lowe et al (2006) research demonstrated the influence of strong imagery and Craven's (2006) video may have been more effective if it was accompanied by similar imagery. Overall it appears logical to suggest that if this experiment were to be improved upon then a different stimulus or an altered version of the stimuli could be used to avoid these possible downfalls.

However the attainment of the perfect fear-inducing stimuli does appear to be very difficult to find or produce. Previous research by Lowe et al (2006) highlighted the issue as immediate findings of felt-responsibility and intentions were diminished over time, when using extremely dramatic global warming scenes. When considering the Poortinga et al (2003) research, the current stimuli possessed some essential qualities, the information was presented by a scientist, which is emphasised by the Kellstedt et al (2008) research to be crucial in gaining an individual's trust. Another core element achieved by the chosen stimulus was the presented time frame. Although it is still discussed as future possibilities, Craven (2009) mentions that this could occur within the next decade, and with an average participant age of 24 they are assured that if global warming is to occur then it could take place within their life time. Referring to global warming occurring within the next decade removes some of the issues within the Tonn et al (2006) research that discovered the consideration of a world in twenty years or more was extremely difficult and removed a personal element, as any answer given was seen as completely hypothetical. Therefore it is arguable that the selected stimuli did possess a number of key qualities required to achieve the desired fear effect, however it cannot be ignored that the results suggest that the video was not the most effective tool on this occasion. It appears essential that more explanatory work is needed within this area to determine an appropriate fear-inducing stimulus, perhaps the use of qualitative questionnaires, after the presentation of fear-inducing global warming information, would be helpful in illuminating the necessary components to an effective stimuli.

Although it could be argued that it was the self-efficacy statement itself that was not constructed to its optimum potential, the fact that very little difference was found across each research component could suggest that the statement was ineffective. When considering Kellstedt et al's (2008) three components to achieved self-efficacy, it was stated that an individual must have acceptance of a human's responsibility for global warming and therefore it might be expected that individuals within the self-efficacy condition would report a higher level of felt-responsibility. However, this was not the case, although both conditions reported a substantial level of felt-responsibility, there was very little difference between the conditions and those within the control condition actually experienced a slightly higher level of felt-responsibility at both Time one and Time two. This suggests that perhaps the intended accomplishment of self-efficacy was not achieved by the presented statement. On assessment of the statement it was very simplistic, however previous work by Zomeran et al (2010) used a similarly minimalistic self-efficacy statement form and found significant higher levels of reported intentions, suggesting that it is possible to achieve. One aspect that was present within the Zomeran et al (2010) statement and not within the present study was the use of a scientist. Their statement was constructed around the opinion of a Prof. Harald Neumann, who was stated to be an independent climate expert from Stanford University. The use of a scientific source has been discussed previously within Kellstedt et al's (2008) research to encourage trust and it could be suggested that the lack of scientific verification within the statement has affected its effectiveness. Therefore it would be interesting to see if a different result would be produced by an alternative self-efficacy statement, perhaps one that does contain a scientific member, although if possible it may be intriguing to construct a number of statements to uncover the required components that are needed to accomplish the desired level of self-efficacy.

When considering Witte's (1992) three components to a successful fear appeal it is disappointing to contemplate that each of the sections may not have been fully achieved within the present research. The first segment requires the individual to have a recognition of global warming's existence, including its severity and their own susceptibility to its threat. However the video was produced to consider all the possible outcomes and within this there is the scenario that global warming does not occur, therefore it could be argued that this could lead the individual into not fully accepting the existence of global warming. The second aspect revolves around inducing a fearful emotional response and, as the questionnaire average highlights, participants remained primarily neutral. The final area considered the level of self-efficacy experienced, but unfortunately within the current study there appeared to be little difference presented between either condition, particularly within the area of felt-responsibility, which is thought to be crucial by Kellstedt et al's (2008), suggesting that the self-efficacy statement was ineffective. Overall it would appear that the present research has not achieved the necessary criteria to produce an effective fear appeal distinguished by Witte (1992).

One element that has to be reflected upon is the sample size. Although there were thirty five participants in total, three participants failed to complete the second part of the study and so decreased the Time two number of participants to thirty two. Due to the between-subject method participants were separated into two groups, resulting in only eighteen participants representing the self-efficacy group at Time two and just fourteen for the control group. The inequality in group size for the two conditions and the generally low sample size could have had a profound effect and may have contributed to the unexpected results. The outweighing of gender representation may have also been an underlying effect. In total there were only twelve males in contrast to thirty three females, the result therefore may be more representative of the female population. Geographical implication may also hinder the results, as the study was completed in one location and therefore makes the findings difficult to generalise. Additionally it should be noted that many of the participants were psychology students and could have attempted to guess the purpose of the research, based on their psychological knowledge, and adapt their answers accordingly. Therefore, it would be suggested that within further research no psychology students should be used, to remove this issue.

Another issue to discuss is the possible effect of the interval. All participants experienced a gap between the first part of the experiment and the second, between five and seven days. During this time the participants may have been exposed to a number of different global warming stimuli, both competing and reinforcing, and therefore it could be suggested that this exposure may have affected the responses given during the second section of the experiment. Perhaps the incorporation of a participants' log would be helpful to monitor any exposure to global warming information during the interval, this could then ensure that the relationship found is not one based on the amount of exposure during the interval. The fact the participants were able to complete the second part in their chosen environment may have also been a confounding variable. During the first section of the experiment each participant experienced the same conditions and could give the questionnaires their full attention, however this cannot be guaranteed when the second part was not observed. To avoid this issue within future research it may be more logical to have the second part of the experiment completed in the same conditions as the first.

Although the average age of twenty four was seen to be beneficial in relation to Kellstedt et al (2008) previous research that highlighted an older generation's difficulty in fully comprehending the issues presented by global warming, when they felt that it would not take place within their life time. However, it could be argued that by having a younger general age group of participants, there are different limitations presented. For example some of the pro-environmental intentions stipulated within the current study may have been hindered due to the individual's living conditions, such as living with their parents and therefore they are not completely in control of the household's actions. Items such as buying Fair Trade or local produce, using eco-friendly cleaning products and energy saving light bulbs, may be perceived as actions that are controlled primarily by the homeowner. A further issue may be limitations created by their environment, such as not having the facilities to grow their own fruit and vegetables, as well as living far from work or the city centre which therefore inhibits their ability to walk when possible. Hopefully by the emphasising of future intention within the questionnaire's opening statement many of these issues could have been overcome. However, if there had been the options for the individual to explain their answers then there could have been a deeper understanding of the findings, this could be helpful within future research.

## **Conclusion**

Overall it would appear that the relationship between self-efficacy and pro-environmental intentions is not as clear as predicted by the alternative hypothesis. Within the current research the findings highlighted very little difference between the control group and the self-efficacy condition, however many reasons have been presented as to why the results unsuccessfully exhibited a positive relationship between self-efficacy and pro-environmental intentions. This has been discussed in reference to Witte's distinguished fear stimuli criteria and ultimately it has been concluded that the current material used in this study was insufficient. Although an interesting result of a decreased pro-environmental intentions score, recorded between Time 1 and Time 2 for the control group, as  $F(1,30) = 7.71$ ,  $p=.009$ , suggests that self-efficacy does play a contributing role in the development of lasting pro-environmental intentions. On the basis on the present research it seems reasonable to suggest that self-efficacy is involved in sustaining lasting pro-environmental intention, but because the current study presented many possible limitations, further exploration is vital in understanding this relationship fully.

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